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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No	:	09/982,656	Confirmation No: 8103
Applicants	:	Richard L. Guldi et al.	
Filed	:	October 18, 2001	
TC/A.U.	:	2856	
Examiner	:	Thomas Noland	
Docket No	:	TI-25047	
Customer No	:	23494	

AMENDED BRIEF ON APPEAL

Commissioner for Patents
PO Box 1450
Alexandra, VA 22313-1450

Dear Sir:

In support of their appeal of the Final Rejection of claims in this application, applicants respectfully submit their amended brief.

REAL PARTY IN INTEREST

The real party in interest is Texas Instruments Incorporated, a Delaware corporation with offices at 7839 Churchill Way, Dallas, Texas 75251.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

STATUS OF CLAIMS

This is an appeal of claims 1 to 4, 7, 10, and 14 to 18, all of the rejected claims. Claims 5, 6, 8, and 9 are objected to by Examiner Noland as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 11 to 13 are withdrawn.

STATUS OF AMENDEMNTS

Appellants did not file an amendment in response to the final rejection of April 26, 2004.

SUMMARY OF INVENTION

The present application discloses a method to determine the particulate content of the exhaust from a process chamber. This method allows the source of the particulates to be identified and eliminated if desired. The preferred embodiment uses an in-situ particle monitor placed in the exhaust line so that effluent content can be monitored. When the particle count exceeds a certain threshold or upon some other predetermined event, such as a timing event, a particle sampling device is inserted into the exhaust stream.[1] In the preferred embodiment, the particle sampling device comprises a moveable wand with a collector on the end[2]. This collector can be removed and placed in an analysis tool, such as a SEM.

ISSUES

Whether claims 1 to 4, 7, 10, and 14 to 18 are unpatentable under 35 U.S.C.S. § 103(a) over McAndrew et al. US 5,963,336 in view of Kai JP 1-261832.

GROUPING OF CLAIMS

Claims 1, 2, 3, and 4 form one group; claims 7 and 10 form one group; and claims 14, 15, 16, 17, and 19 form one group.

ARGUMENTS

Issue : Whether claims 1 to 4, 7, 10, and 14 to 18 are unpatentable under 35 U.S.C.S. § 103(a) over McAndrew et al. US 5,963,336 in view of Kai JP 1-261832.

1. The Office action did not established prima facie obviousness against claim 1.

a. The disclosed two-step method is not found in the prior art.

[1] Specification page 2, ll. 15-26 and drawing figure 1.
[2] Reference numeral 110.

Claim 1 describes a fabrication method that includes two distinctive steps. One step requires monitoring the exhaust of a process chamber and the other step requires automatically sampling the exhaust when a predetermined event occurs. This two-step method is not disclosed in either of the cited references.

In the background section of the specification, applicants explained that, due to the many sources of particulate generation, the density of particulates in the exhaust from a vacuum chamber is somewhat unpredictable. In-situ particulate monitors alone can detect the presence of particles, but do not indicate the source of particles. This leaves characterization and source determination to further inquiry.

Applicants further explained that the present application discloses an innovative way to determine the particulate content of the exhaust from a process chamber. This allows the source of the particulates to be identified and eliminated if desired. The preferred embodiment uses an in-situ particle monitor placed in the exhaust line so that effluent content can be monitored. When the particle count exceeds a certain threshold or upon some other predetermined event, such as a timing event, a particle sampling device is then inserted into the exhaust stream. This collector can be removed and placed in an analysis tool, such as a SEM to identify the nature and therefore the source of the particles.

The Office action conceded that "the references do not specifically disclose sampling in response to a control signal...."[3] Because the cited references fail to disclose all the elements in claim 1, prima facie evidence of obviousness is not established.

b. The cited references do not teach the problem or its source.

Claim 1 directs to a problem with in-situ particulate monitors that it alone can detect the presence of particles but cannot indicate the source of particles in a typical fabrication situation. The Office action concedes that the McAndrew reference does not disclose activation of the sampling in response to a signal but

[3] Office action of April 26, 2004, p. 2, ll. 17-18.

reasons that such would have been an obvious expedient to avoid unnecessary sampling and in view of the teaching of Kai. This reasoning must fail because the Kai reference, which the Office action relies on to supplement the primary reference, also does not teach activating a sampler in response to a signal. Furthermore, neither one of the references teaches the problem of the inadequacy of in-situ particle monitoring. In fact, both references teach in-situ particle monitoring and both have the short-comings that is addressed in this application.

It is well established that "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified." [4] Because neither cited reference recognizes the problem that claim 1 is designed to solve, the Office action falls short in establishing obviousness.

c. 'Obvious to try' a combination is not prima facie obviousness.

The Office action rejects claim 1 on the basis of "obvious to try" rationale. However, this is not the standard of 35 U.S.C. §103." [5]

The Office action states that McAndrew et al. discloses sampling of the exhaust from an IC manufacturing process and the control of such system can be activated in response to alarm signals.[6] Even though the passage in the McAndrew reference cited in the Office action discloses an alarm, the alarm does not function as a trigger. On the contrary, the alarm is activated when the sampling result exceeds a predefined limit:

> This embodiment is preferably used in conjunction with a visual and/or audio alarm system 22. The alarm system 22 can be activated upon the happening of a certain event, such as the detected absorption or gas concentration exceeding a predefined limit.[7]

The Kai reference, according to the Office action, teaches "particle measuring in response to a scattering triggering signal, a process analog to

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[4] In re Peehs, 612 F.2d 1287. (CCPA 1980).
[5] In re Geiger, 815 F.2d 686 (Fed. Cir. 1987).
[6] Office action of April 26, 2004, p. 2, ll. 7-8.
[7] U.S. 5,963,336, col. 11, l. 66 – col. 12, l. 3.

sampling in response to such a trigger since the counting of the particles in a particular batch of sample air could be considered to a sampling collection of that particular batch."[8] The argument must also fail because the Kai reference does not disclose any "trigger" or "response". What is disclosed in the Kai reference is a monitoring system in which:

> ... [p]articles in sample air passing through the detection cell 11 generate light scattering by He-Ne laser 10 inside an active cavity. When this scattering is detected by the side-way scattering method in the detection cell 11, diameters of particles and the number of particles in sample air are counted by a particle measuring unit 1 so that cleanliness in a vacuum system of the semiconductor manufacturing equipment can be controlled[9].

It is clear that the system disclosed in the Kai reference is only a straight forward particle monitoring system that includes a He-Ne laser to scatter the particle for a detection cell to measure the scattered signal.

If the rational of the Office action is followed, it can only be conclude that the rejection is based on "obvious to try" and only by re-naming the elements in the references and altering the sequence of events. Such rejection is improper.

d. There is no basis in the art for combining references.

It is well established that identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.[10]

The references cited in the Office action do not motivate, suggest, or teach the desirability to combine a monitoring step with a sampling step upon an activating event.

First, the McAndrew reference discloses the following:

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[8] Office action of April 26, 2004, p. 2, ll. 11- 14.
[9] JP-1-262832, Constitution.
[10] In re Kotzab, 217 F.3d 1365 (Fed. Cir. 2000).

> a chamber effluent monitoring system that has a light source and a main detector in optical communication with the sample region through one or more light transmissive window. The light source directs a light beam into the sample region through one of the one or more light transmissive window. The light beam passes through the sample region and exits the sample region through one of the one or more light transmissive window. The main detector responds to the light beam exiting the sample region. The system allows for in situ measurement of molecular gas impurities in a chamber effluent, and in particular, in the effluent from a semiconductor processing chamber.[11]

It is clear from reading the above passage, which is cited in the Office action as a base for rejecting claim 1, that there is no evidence of combining the two steps in claim 1.

Similarly, the Kai reference discloses a dust counter for controlling cleanliness of semiconductor manufacturing equipment as follows:

> ... Particles in sample air passing through the detection cell 11 generate light scattering by He-Ne laser 10 inside an active cavity. When this scattering is detected by the side-way scattering method in the detection cell 11, diameters of particles and the number of particles in sample air are counted by a particle measuring unit 1 so that cleanliness in a vacuum system of the semiconductor manufacturing equipment can be controlled[12].

Kai does not motivate, suggest, or teach the desirability in the reference to combine a monitoring step with a step of sampling the exhaust when a predetermined event occurs in a chamber effluent monitoring system.

In summary, (a) the references do not include the two-step method disclosed in claim 1, (b) the cited references do not recognize the problem of the inadequacy of monitoring alone, much less disclose a solution to this problem; (c) 'obvious to try' the combination is not prima facie obviousness; and (d) there is no basis in the references for combining elements. Because the Office action failed to establish prima facie obviousness in rejecting claim 1, claim 1 stands patentable over the cited references.

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[11] U.S. 5,963,336, Abstract.
[12] JP-1-262832, Constitution.

2. The Office action did not establish prima facie obviousness in rejecting claim 7.

Claim 7 describes a fabrication method that includes two distinctive steps. One step requires monitoring at least one signal of a process chamber and the other step requires automatically sampling the exhaust from the chamber when a predetermined event occurs.

The final Office action, based on the same argument, rejects claim 7 as it does claim 1. Applicants respectfully submit that this rejection is also improper because: (a) "the references do not specifically disclose sampling in response to a control signal...."[13] , the references do not disclose the two-step method disclosed in claim 7; (b) the cited references do not even recognize the problem of inadequacy of monitoring alone, let alone disclose a solution to this problem; (c) 'obvious to try' the combination of the elements is not motivation to combine and is not prima facie evidence for obviousness; and (d) there is no basis in the references for combining elements. Because the Office action fails to establish prima facie obviousness in rejecting claim 7, the claim stands patentable over the cited references.

3. The Office action did not establish prima facie obviousness in rejecting claim 14.

Claim 14 describes a wafer processing system that comprises three elements: a chamber with an exhaust; a particle monitor located in the exhaust; and a particle sampler. In addition, the particle monitor is connected to cause the sampler to gather sample from the exhaust.

The Office action rejects claim 14 as obvious for the same argument with which it rejects claims 1 and 7. The reason why the 103(a) rejection against claim 14 is improper is because: (a) "the references do not specifically disclose sampling in response to a control signal...."[14], the references do not disclose the two-step method disclosed in claim 14; (b) the cited references do not even recognize the problem of inadequacy of monitoring alone, let alone disclose a solution to this problem; (c)

[13] Office action of April 26, 2004, p. 2, ll. 17-18.
[14] Id.

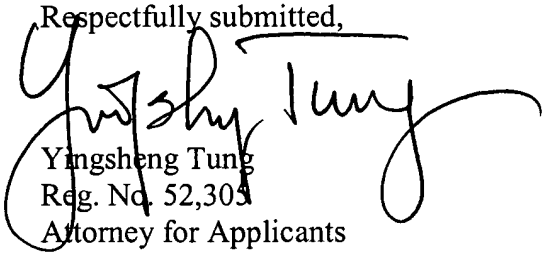
'obvious to try' the combination of the elements is not motivation to combine and is not prima facie evidence for obviousness; and (d) there is no basis in the references for combining elements. Because the Office action fails to establish prima facie obviousness in rejecting claim 14, the claim stands patentable over the cited references.

Conclusion

The final Office action fails to establish prima facie obviousness in rejecting independent claim 1 and its dependent claims 2, 3, and 4; claim 7 and its dependent claim 10; and claim 14 and its dependent claims 15, 16, 17, and 18 because (a) the references do not disclose all the elements in the claims; (b) the cited references do not recognize the problem of inadequacy of particle monitoring system, which the claims are designed to solve; (c) 'obvious to try' the combination is not prima facie obviousness; and (d) there is no basis for combining references.

Applicants respectfully request the Board to reverse the final rejection and allow the claims on appeal.

Respectfully submitted,



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APPENDIX

The claims on appeal read as follows:

1. A fabrication method, comprising the steps of:
   monitoring the exhaust of a process chamber; and
   automatically sampling said exhaust when a predetermined event occurs.
2. The method of Claim 1, wherein said step of monitoring is done using an in-situ particle monitor.
3. The method of Claim 1, wherein said step of sampling is done by inserting a collection device into said exhaust.
4. The method of Claim 1, wherein said event is the detection of a particle excursion.
7. A fabrication method, comprising the steps of:
   monitoring at least one signal of a process chamber; and
   sampling the exhaust from said process chamber when a predetermined event occurs.
10. The method of Claim 7, wherein said predetermined event is the detection of a given particle flux by an in-situ particle monitor located in said exhaust.
14. A wafer processing system, comprising:
   a chamber with an exhaust;
   a particle monitor located in said exhaust, wherein said particle monitor is connected to cause a particle sampler to gather samples from said exhaust.
15. The system of Claim 14, wherein said sampler gathers samples by being inserted into said exhaust.
16. The system of Claim 14, wherein said sampler gathers samples by opening valves so that said exhaust passes to a sampling area.
17. The system of Claim 14, wherein said sampler is a membrane filter.
18. The system of Claim 14, wherein said monitor causes said sampler to gather samples when a predetermined particle flux is detected.

CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8

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9-23-04

Jackie McBride

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